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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/043,970	01/11/2002	Donald J. Fasen	10011652-1	8114

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EXAMINER	
DRULA, BRIAN F	

ART UNIT	PAPER NUMBER
2652	

DATE MAILED: 10/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/043,970	FASEN ET AL.	
	Examiner	Art Unit	
	Brian F. Drula	2652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 January 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *07312003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Objections

2. Claims 18 and 19 are objected to because of the following informalities:

Claims 18 and 19, in line 2, use the phrase "objects translate relative to one through the operative range". The word "another" should be inserted between "one" and "through" for the claim to make better sense.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-4, 6-7, 9-12, and 14-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Yagi et al. (US/5896032) --art cited by applicant on PTOL-1449--.

In regards to claim 1, Yagi et al. discloses a movable system (figure 6), in the form of a position detection device, having capacitance-based position sensing,

including a pair of objects, in the form of a first member (1) and a second member (2), an actuator (811-816) configured to effect an operative range of relative motion between the objects along an axis (column 7, lines 64-67), and a capacitance-based position sensor including a first plate (B1-B3) secured to one of the objects, and a pair of second plates (A1-A3) secured to the other of the objects so that the second plates are adjacent and coplanar, and so that the second plates are spaced from, and parallel to, the first plate as the objects move relative to one another along the axis (column 8, lines 1-7), where the configuration of the first plate and the second plates results in two spaced-plate capacitors having capacitances that vary as the objects move relative to one another within the operative range along the axis (column 5, lines 5-10), where the capacitance-based position sensor uses the capacitances to generate output usable to determine relative position of the objects along the axis (column 5, lines 11-16).

In regards to claim 9, Yagi et al. discloses a sensor that outputs varying capacitance based upon changes in relative position along an axis between a pair of objects (figure 1), including a first plate (B1) secured to one of the objects, and a pair of second plates (A1 and A2) secured to the other of the objects so that the second plates are adjacent and coplanar and so that the second plates are spaced from and parallel to the first plate as the objects move relative to one another along the axis (column 4, lines 45-49), where the configuration of the first plate and second plates results in two spaced-plate capacitors having capacitances that vary as the objects move relative to one another along the axis (column 5, lines 5-10), where the sensor uses the

capacitances to generate output usable to determine relative position of the objects along the axis (column 5, lines 11-16).

In regards to claim 14, Yagi et al. discloses a sensor that outputs varying capacitances based upon changes is relative position between a pair of objects (figure 2), including a first plate assembly (B) configured to be fixed to one of the objects including first plates, and second and third plate assemblies (A) in the form of a first set of A1, A3, ..., and a second set of A2, A4, ... (column 5, lines 28-32) configured to be fixed to the other of the objects, the second plate assembly including second plates, the third plate assembly including third plates, where the plate assemblies are configured so that total overlap between the first plates and the second plates, and between the first plate and the third plates, repeatedly increases and decreases as the objects translate relative to one another through an operative range of motion along an axis (column 6, lines 4-8), such that the first plate assembly forms with each of the second and third plates assemblies a variable capacitor having capacitance that varies with relative position of the objects (column 5, lines 50-53).

In regards to claim 25, Yagi et al. discloses a movable system (figure 2) having capacitance based position sensing, including a pair of objects, in the form of first member (1) and second member (2), a first plate assembly (B) secured to one of the objects, including first plates, and second and third plate assemblies (A) secured to the other of the objects, the second plate assembly including second plates, the third plate assembly including third plates, where the plate assemblies are configured so that total overlap between the first plates and the second plates, and between the first plates and

the third plates, repeatedly increases and decreases as the objects translate relative to one another through an operative range of motion along an axis (column 6, lines 4-8), such that the first plate assembly forms with each of the second and third plates assemblies a variable capacitor having capacitance that varies with relative position of the objects (column 5, lines 50-53).

In regard to claims 2 and 10, Yagi et al. discloses a capacitance measuring circuit (figure 2) that is configured to apply a time-varying input signal to one of the pair of second plates, and apply an inversion of the time-varying input signal to an other of the pair of second plates (column 5, lines 32-35).

In regard to claims 3 and 11, Yagi et al. discloses the time-varying input signal includes a sinusoidal carrier or AC signal (column 5, lines 26-27).

In regard to claims 4 and 12, Yagi et al. discloses the capacitance-based position sensor is configured so that the output is substantially independent of perpendicular spacing variations occurring between the first plate and each of the second plates (column 8, lines 63-65).

In regards to claim 6, Yagi et al. discloses that one of the pair of objects is a computer-readable storage medium movably mounted within an enclosure (column 8, lines 44-46), the capacitance-based position sensor being configured to generate the output so that the output is usable to determine relative position of the storage medium to the enclosure (column 8, lines 51-59).

In regards to claim 7, Yagi et al. discloses a read/write device fixed to the enclosure, the read/write device being configured to read data from and write data to the storage medium (column 8, lines 46-50).

In regards to claim 15, Yagi et al. discloses the plate assemblies are configured to be secured to the objects so that, as the objects translate relative to one another through the operative range of motion along the axis, the first plates and parallel to (column 7, lines 9-13 and 16-18) and spaced perpendicularly from (column 4, lines 47-49) both the second plates and the third plates.

In regards to claim 16, Yagi et al. discloses the plate assemblies are configured to be secured to the objects so that, as the objects translate relative to one another through the operative range of motion along the axis, the first plates are coplanar, or in a linear array (column 5, lines 20-22) and the second and third plates are coplanar and spaced perpendicularly from the first plates (column 5, lines 19-20).

In regards to claim 17, Yagi et al. discloses the second and third plates are interleaved such that one of the second plates is positioned between each pair of neighboring third plates (column 5, lines 28-32).

In regards to claim 18, Yagi et al. discloses the plate assemblies are configured so that, as the objects translate relative to one another through the operative range of motion along the axis, the total over lap between the first plates and the second plates varies inversely with the total overlap between the first plates and the third plates (column 6, lines 11-16).

In regards to claim 19, Yagi et al. discloses the plate assemblies are configured so that as the objects translate relative to one through the operative range of motion along the axis, the capacitance produced between the first plates and the second plates varies inversely with the capacitance produced between the first plates and the third plates (column 6, lines 11-16).

In regards to claim 20, Yagi et al. discloses the variable capacitors from part of a capacitance-measuring circuit configured to produce, in response to application of an input to at least one of the plate assemblies, and output based upon capacitance between the first plates and the second plates, and between the first plates and the third plates (column 6, lines 4-8)

In regards to claim 21, Yagi et al. discloses the capacitance measuring sircuit is configured so that the output is substantially independent of perpendicular spacing variations occurring between the first plates and the second plates and between the first plates and the third plates (column 8, lines 63-65).

In regards to claim 22, Yagi et al. discloses the capacitance-measuring circuit is configured to apply a time-varying input signal to the second plate assembly and to apply an inversion of the time-varying input signal to the third plates assembly (column 5, lines 32-35), in order to produce the output.

In regards to claim 23, Yagi et al. discloses the time varying input signal is sinusoidal, or an AC signal (column 5, lines 26-27), and the inversion of the time-varying signal is produced through a phase shift of the sinusoidal time-varying input signal (column 5, line 34).

In regards to claim 24, Yagi et al. discloses where the first plate assembly is configured to be operatively secure to one of a computer-readable storage medium and an enclosure within which the storage medium is mounted (column 7, lines 16-17 and column 8, lines 55-56), and the second and third plate assemblies are configured to be operatively secured to the other of the storage medium and enclosure (column 7, lines 17-18 and column 8, lines 53-55), the sensor thus being configured to output varying capacitance based upon changes in relative position between the storage medium and enclosure (column 7, lines 31-33).

4. Claim 8 is rejected under 35 U.S.C. 102(b) as being anticipated by Andermo (US/RE34741).

Andermo discloses a movable system (figure 1), in the form of a position detection device, having capacitance-based position sensing, including a pair of objects, in the form of a first support member (20) and a second support member (30), translationally movable relative to one another through an operative range of x-axis motion along an x-axis, and through an operative range of z-axis motion along a z-axis that is perpendicular to the x-axis (column 5, line 64-column 6, line 2 and column 6, lines 11-13), and a capacitance-based position sensor, including a first plate fixed to one of the objects (320), and a pair of second plates fixed to the other object (222), where the first plate and the second plate are perpendicular to the z-axis, or parallel to the x-axis (figure 1), and where the first plate forms with each of the second plates a variable capacitance that varies as the objects are moved over the operative ranges of

x-axis motion and z-axis motion due to varying overlap and spacing between the first plate and each of the second plates (column 5, lines 40-53), the variable capacitances forming part of a circuit having an output-input transfer function that is substantially independent of spacing variations occurring between the first plate and each of the second plates as a result of the objects moving relative to one another through the operative range of z-axis motion, or tilt, the transfer function being improved by modifying the geometry of the first plate electrode to reduce errors induced by tilt (column 7, lines 33-36).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 5 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yagi et al. in view of Andermo (US/RE34741).

In regards to claims 5 and 13, Yagi et al. discloses a movable system with a capacitance measuring circuit sensor as disclosed in the rejections of claims 1 and 9 under 35 USC 102 above.

Yagi et al. fails to disclose the capacitors of the capacitance measuring circuit having an output-input transfer function that is substantially independent of

perpendicular spacing variations occurring between the first plate and the second plates as a result of the pair of objects moving relative to one another.

Andermo discloses a modification of the geometry of the first plate, thereby inherently modifying the transfer function, to significantly reduce the effects of perpendicular spacing variations, or tilt, occurring as a result of the pairs of objects moving relative to one another (column 7, lines 33-36).

It would have been obvious to one skilled in the art at the time of invention to modify the Movable system with the capacitance measuring circuit sensor as taught by Yagi et al. with the use of the geometry modification to improve the transfer function as taught by Andermo in order to allow capacitance-type devices to be constructed with less mechanical tolerances and enable production of less expensive devices while maintaining an improved level of accuracy (column 7, lines 49-53).

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Miller (US/4893071) discloses a capacitance based high-resolution position measuring system that also is largly unaffected by small angular motions of the sensors. Andermo (US/4879508) discloses a capacitance-type measuring apparatus for making absolute position measurements with first and second support members having and array of transmitter electrodes on the first member and array of receiver electrodes on the second member. Jordil (US/6072318) discloses a capacitive measuring device that has an object with an array of electrodes and another

object with an array of receiving electrodes, the capacitive coupling between the different electrodes allows the position of the first object to be determined. Meyer (US/4841225) discloses a capacitive sensor for measuring displacement with a slide with a group of emitting electrodes and a scale with a group of receiving electrodes to measure the displacement of the slide. Ueno et al. (US/5861754) discloses a position detection device that has a first and second substrate and four variable capacitors with a detection circuit. Meyer (US/5304937) discloses a capacitive position sensor with an electrode array on a first object cursor and a scale on a second object. Tousson (US/5708367) discloses a digital position sensor including a moving pointer with an electrode and array of position electrodes, the position electrode corresponding to the pointer producing a signal when interrogated. Naberhuis (US/6738336) discloses a data storage device including a micromover that includes a rotor connected to a storage medium and a stator that faces the rotor, the rotor can be effected by the application of appropriate potentials to electrodes of the stator so as to create a field that displaces the rotor in a desired manner.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian F. Drula whose telephone number is (703) 605-1157. The examiner can normally be reached on Mon. - Fri., 8 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T Nguyen can be reached on (703) 305-9687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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